Alexander Jost

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The International Symposium on History of Machines and Mechanisms 2008 took place from November 11-14 at the National Cheng Kung University in Tainan. One special focus of this conference and its proceedings, which were published a year later, was the development of machine technology in East Asian history. Out of a total of 30 articles, twelve are specifically concerned with East Asian topics.

Most of the volume’s articles present one type of machine or technology used in historical times and describe its function in depth. Numerous pictures of original machine parts, historical illustrations, modern reconstructions or construction drawings are provided to enhance the reader’s delight and comprehension.

Three articles are directly related to the use of wind power in traditional China. The first, by Zhang Baichun, examines “Ancient Chinese Windmills”. He starts by discussing their possible origins. Contrary to Needham’s argument, that windmill technology first reached northern China from Iran in the twelfth or thirteenth century during the time of the Western Liao or even Yuan, he points out the appearance of a description of a wind-driven water-lifting device in an earlier source in south China, namely in the Shaoxi ji 湖集 (Collected Works of Shaoxi) from the Southern Song period (1127-1279). This coincides with the mention of a fengche 風車, most likely meaning a wind-driven wheel for water lifting, in the Daye Fu 大冶賦 dating from the same period. Although Zhang thinks that windmills were invented in Iran prior to their appearance in China, he emphasizes in his thorough discussion of vertical-axle and horizontal-axle windmill technology the originality of early Chinese devices, which does not point to Persian origins.

1 Daye Fu 大冶賦 (Rhapsody of the Great Smelting), by Hong Zikui 洪咨夔, ed. Sibu congkan.
In addition, together with his colleagues Lie Sun, Lin Tsung-Yi and Zhang Zhizhong as well as the carpenter Chen Ya, Zhang Baichun conducted other research of a largely experimental character, that is the reconstruction, operation and analysis of a traditional vertical-axle windmill with square-pallet chain-pump in Sheyang County, Jiangsu. This project resulted in two papers, which along with much photographic material and construction plans, give a detailed description of this masterpiece of traditional Chinese engineering.

Another approach towards the understanding of ancient Chinese water lifting technology is employed by Guan Xiaowu in his translation and interpretation of the Tang dynasty Shuilun fu, the “Rhapsody on Waterwheels”. Following this early literary description and by consulting numerous later accounts, he retraces the construction and operation of this widely used and admired irrigation apparatus, and places it within the context of its time. “Yì yì zài — What a miracle!” as the poem and its translation state at the end.

East Asian topics of much later concern are also discussed in the volume. One of them is the article on the “Technology Transfer of Educational Machine Mechanism Models” by Shiroshita Sohei. He shows how this example of European technology was transferred to, and spread within, East Asia. Machine models originally produced by a German company were bought by Kyoto University around the turn of the last century, and then during the following ten years reproduced by a Japanese company and sold to different places, among them several universities in Taiwan.

The series of machines and technologies described in the volume continues from hand-looms through levers, rods, ploughs and locks to very specific mechanisms, like the seismoscope described in Yan Hong-Sen’s contribution.

As the title indicates, the approaches and ideas of most of the authors are of a rather technical and engineering-orientated nature, but nonetheless also of great use for the sinologist or japanologist who might, on the first sight, pass over the book. Furthermore, the large number of Chinese and Japanese scientists introducing the results of their research in English, makes a great deal of detailed knowledge in this field available to the western reader for the first time. Thus the book is valuable for all students of Asian history willing to broaden their horizons, and, of course, for any other reader to get detailed insights into the world of the history of technology in East Asia.
Reviews

List of contributions in the volume with relevance to East Asia:

- “A Historical Overview of Japanese Clocks and Karakuri” (Yasuhiro Yokota)
- “An Introduction to the Spinning and Weaving Devices and Tools of the Miao Ethnic Group in the North of Yunnan Province” (Wang Li-Hua)
- “Ancient Chinese Windmills” (Zhang Baichun)
- “An Interpretation of a Shuilun fu 水輪賦 (Rhapsody on Waterwheel)” (Guan Xiao-wu)
- “Lei Si Jing 蓬 葨 经 and the Curve-Beam Plough of the Tang Dynasty of China” (Dai Wusan)
- “Crank-Connecting Rod-Mechanism: Its Application in Ancient China and its Origin” (Feng Lisheng and Tong Qingjun)
- “The Development of Knowledge on Levers in Ancient China” (Tian Miao and Zhang Baichun)
- “An Investigation and Reconstruction of Traditional Vertical-Axle-Styled ‘Chinese Great Windmill’ and its Square-Pallet Chain-Pump” (Sun Lie, Zhan Baichun, Lin Tsung-Yi and Zhang Zhizhong)
- “An Approach for the Reconstruction Synthesis of Lost Ancient Chinese Mechanisms” (Yan Hong-Sen)
- “Multiple Bolts as Security Devices” (Huang Hsing-Hui and Lin Yi-Ming)
- “Technology Transfer of Educational Machine Mechanism Models” (Sohei Shirosita)